

REVISION OF BRAZILIAN *ERYLUS* (PORIFERA: ASTROPHORIDA:
DEMOSPONGIAE) WITH DESCRIPTION OF A NEW SPECIES

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Prior to the present study only four species of *Erylus* were described for the Brazilian coast: *E. formosus* Sollas, 1886, *E. corneus* Boury-Esnault, 1973, *E. topsenti* Lendenfeld, 1903 and *E. oxyaster* Lendenfeld, 1910. Re-examination of these species, and additional material using scanning electron microscopy, detected new characters necessitating a revision of the genus in Brazilian waters. Collections were made by SCUBA or narghile (0-30m) or dredging (13-918m depth). Re-examination of material detected the presence of *E. alleni*, a Caribbean species with southern limit at the coast of Rio Grande do Sul state (31°20'S, 48°40'W) and three new species, one described here, *E. diminutus* sp. nov., a sister-species of *E. oxyaster* (Galapagos), and two others still undescribed, one of which was previously misidentified as *E. topsenti* by Mothes-de-Moraes (1978) from the Brazilian coast. □
Porifera, Demospongiae, Astrophorida, Geodiidae, Erylus, revision, new species, taxonomy, Brazilian coast.

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Erylus Gray is a genus with Tethyan distribution restricted to tropical and subtropical areas (Van Soest, 1994). Gray (1867) originally described this genus: as "Sponge expanded, mammillated, ending in an oscule. Spicules of three kinds: 1.stellate; 2.ternate, rays forked; 3.subcylindrical, waved. With oblong ovisacs, formed of claviform spines". Subsequent authors enlarged the definition. Ridley (1884): "Comprising Choristid Tetractinellid with the surface covered by a layer of detached discoid trichite globate, and having besides a zone - zone spicule and small stellates with slender few rays. Form lobate. Vents single or multiple"; Sollas (1888): "The sterraster is seldom spherical; the somal microscelere is a centrotylote microrhabd. The incurrent chones are uniporal; and the oscule is the patent opening of a cloaca"; Topsent (1894): "Sterrasters rarely spherical. Somal microscelere is a microxea usually centrotylote. Poral cone typical uniporal; larger oscule"; Lendenfeld (1903, 1907): "Geodiidae with tetractines megascleres (triaene and derivatives) radially arranged; disc-shaped sterrasters at the surface covered by microrhabds"; Lendenfeld (1910): "With uniporal afferents and uniporal efferents or larger oscules. Without ana- or protriaenes"; Dendy (1916) defined genus as

family Erylidae, with diagnosis: "Astrotetraxonida with a cortex containing aspidasters. The typical megascleres are triaenes and oxea (or strongyla). The microsccleres include microrhabds and choanosomal euasters"; Wilson (1925): "The afferent orifices are uniporal apertures into chone canals efferent orifices also the uniporal openings of chone canals, or in other cases larger oscula. The megasclere-complex includes orthotriaenes and rhabds; anatriaenes and protriaenes absent. The sterraster is more or less flattened, often so flattened as to be a thin plate. Microrhabds (here spicules of good size, reaching a length of 70µ), typically centrotylote, form a dermal layer. Euasters also occur, but not at the surface"; de Laubenfels (1936): "*Erylus* Gray is a very different sort of sponge entirely, with the sterrasters derived in a different way from peculiar disc-shaped beginnings. Even when fully developed they are much more disc-shaped than are those in *Geodia*"; Van Soest & Stentoft (1988): "Geodiidae with flattened or disc-shaped sterrasters and ectosomal microrhabds"; Desqueyroux-Faundez & Van Soest, (1997): "Geodiidae with uniporal afferent and efferent surfaces or larger oscules. Triacnes short-shafted ortho- or plagiotriaenes; no ana- or protriaenes. Sterrasters usually flattened into aspidasters".

The foregoing shows the gradual evolution of a definition for *Erylus*, and the different interpretations made by various authors on importance of certain characters over others.

The present study revises the species of *Erylus* from the Brazilian coast (Fig.1), based on re-examination of existing and new material, using scanning electron microscopy (SEM). Prior to this study only four species were recorded for the region: *E. formosus* Sollas, 1886, *E. corneus* Boury-Esnault, 1973, *E. topsenti* Lendenfeld, 1903 and *E. oxyaster* Lendenfeld, 1910.

MATERIALS AND METHODS

Two specimens were collected by SCUBA or Narghilé (0-30m). Most material examined was dredged from 13-918m depth, carried out under the auspices of Diretoria de Hidrografia e Navegação da Marinha (DHNM); Departamento de Recursos Pesqueiros da Superintendência de Desenvolvimento do Nordeste (SUDENE); Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS); Projeto Recursos Vivos da



FIG.1. Map showing known distribution of *Erylus* species along the Brazilian coastline: □ *E. diminutus* sp.n., △ *E. allenii*, ■ *E. formosus*, ▲ *E. corneus*. Scale bar 1200km.

Zona Econômica Exclusiva (REVIZEE) score Norte II supported by Universidade Federal do Maranhão (UFMA), and score Nordeste supported by Universidade Federal de Pernambuco (UFPE); Superintendência do Desenvolvimento da Pesca (SUDEPE), Ministério da Agricultura, Brasília; "Programa Rio Grande do Sul-I" (PRGS-I), supported by Universidade de São Paulo and Governo do Estado do Rio Grande do Sul; Projeto Talude, Fundação Universidade do Rio Grande (FURG), Brazil; Britannic Expedition H.M.S. 'Challenger'; and French Expedition 'Calypso'.

Dissociated spicule mounts, thick sections and preparations for SEM study were made according methods described by Mothes (1996). Spicule measurements are given as minimum-mean-maximum, N=20 (except for the new species with N=50), and mean measurements are not supplied when N was smaller than 20. Spicule measurements are given in μm .

Abbreviations cited in the text: BMNH, The Natural History Museum, London; FZB, Fundação Zoobotânica do Rio Grande do Sul, Brazil; MCN, Museu de Ciências Naturais of FZB, Brazil; MCNPOR, MCN Porifera collection; MHNG, Muséum d'Histoire Naturelle, Genève; MNHN, Muséum National d'Histoire Naturelle, Laboratoire de Biologie des Invertébrés Marins et Malacologie, Paris (DNBE, Boury-Esnault collections); USNM, National Museum of Natural History, Smithsonian Institution, Washington DC; ZMA, Zoologisch Museum, Universiteit van Amsterdam, Amsterdam; ZMB, Museum für Naturkunde an der Humboldt-Universität zu Berlin, Berlin.

SYSTEMATICS

Class **Demospongiae** Sollas, 1885
Order **Astrosporida** Lévi, 1973

DEFINITION. Sponges with astrose microscleres sometimes accompanied by microxeas or rod-shaped spicules. The megascleres are tetractines, frequently triaenes, often occurring together with oxeas. The skeletal framework is radially arranged at least peripherally, but spicules may occur in confusion in the interior. Either tetractinal megascleres or microscleres or both may be lost to give genera having oxeas and astrose microscleres or only oxeas for spicules. A radial skeletal architecture and generally coarse texture permit recognition of these forms as astrosporida (Hartman, 1982).

Family Geodiidae Gray, 1867

DEFINITION. Sponges with either long (or short-shafted) triaenes and oxeas or strongyles as megascleres. Microscleres always include sterrasters (these are modified aspidasters in *Erylus*) which form closely packed cortical armour at the surface. Other microscleres that may be present are euasters, microrhabs, and spherules. The shape varies from thickly encrusting to massive to shallow-bowl-shaped (Hartman, 1982).

Genus *Erylus* Gray, 1867

Erylus Gray, 1867; Wiedenmayer, 1977; Van Soest & Stentoft, 1988; Desqueyroux-Faundez & Van Soest, 1997. Type species: *Stelletta mammillaris* O. Schmidt, 1862 by monotypy. Fragments of type material examined: BMNH 1867.3.11.32, Adriatic; BMNH 1868.3.2.42, Algiers.

DIAGNOSIS. Geodiidae with ectosomal microrhabs and aspidasters or sterrasters with the following forms: elliptical to disc-shaped, flattened to globose, irregular (with lobes) or regular outline and microspined to smooth surface. Incurrent channels are uniporal; oscules are large.

KEY TO BRAZILIAN ERYLUS

1. Orthotriaenes present. 2
Dichotriaenes present with short rhabd (cladome 285.0-418.0/ 38.0-57.0µm; rhabd 256.5-304.0/ 38.0-57.0µm) 4
2. Digitiform aspidasters present (95.0-305/ 11.5-52.2µm) and smooth centrotylote microstrongyles . *E. formosus*
Elliptical aspidasters and smooth centrotylote microxeas present 3
3. One category of oxyaster present (9.2-23µm) . *E. corneus*
Two categories of oxyasters present (oxyaster I 23.0-57.5/oxyaster II 8.1-27.6µm) *E. alleni*
4. Strongyles present varying to strongyloxeas (460-920/ 9.5-23.8µm); aspidasters with slightly irregular outline (159-228.8/ 105.8-151.8µm) . . . *E. diminutus* sp.nov.

Erylus diminutus sp. nov.
(Figs 2A-B, 3A-H)

MATERIAL. HOLOTYPE: MCNPOR 347: Rio Grande do Sul, Brazil, 30°50'S, 49°13'W, 183m depth, x.1968, coll. N/Oc. Prof. W. Besnard. SCHIZOHOLOTYPE: ZMA (microscope slides).

ETYMOLOGY. Named for the presence of dichotriaenes and microrhabs smaller than those described in *E. oxyaster*.

DESCRIPTION. *Shape*. Irregular to sublobate fragment, massive sponge with 3.4cm length, 2.3 cm width and 1.9 cm height.

Colour. Gray-white in alcohol.

Oscules. Small, not conspicuous.

Texture and surface characteristics. Fragile consistency with a slight hardening only in the cortex. Smooth surface. Small openings uniformly distributed.

Ectosome. Centrotylote microstrongyles are slightly tangential to the surface and become obliquely oriented internally in the interstices between the aspidasters. Aspidasters have a compact and irregular regional distribution in the inner cortex.

Choanosome. Dichotriaenes with cladome oriented tangentially to cortex. Strongyles, in bundles of 2-12, bundles 76-190µm wide, scattered among the dichotriaenes. Oxyasters, centrotylote microstrongyles and sterrasters in several stages of development are randomly distributed throughout the choanosome.

Megascleres. Strongyles, sometimes varying to strongyloxeas, thick, straight to slightly curved, sometimes mucronate at one side or with unilateral expansion near their extremity, axial canal visible (460.0-732.6-920.0/ 9.5-18.0-23.8µm). Dichotriaenes are strong with short, straight and gradually pointed rhabd; deuteroclad with variable extremities: from acerate to blunt, curved or sometimes bifurcate; Cladome 684.0-855.0µm, rhabd 256.5-304.0/38.0-57.0µm, clads 285.0-418.0µm, deuteroclad 213.8-289.8µm, protoclad 118.8-171.0µm.

Microscleres. Centrotylote microstrongyles smooth, straight or slightly curved, extremity blunt or rarely mucronate, rare microxeas. Central swelling very distinct (39.1-48.0-59.8/ 3.5-5.3-6.9µm). Elliptical aspidasters, rarely disc-shaped, generally with distinct hilum. In the young stage spicules are radially striated discs. Their outline presents discrete lobose marginal protuberances. Adult spicules present serrated margins because microspine density increases towards the edges. Sometimes spicules have only few spines. The outline of aspidasters is irregular with slight digitiform or lobulate expansions. Surface with stellate microspination, divided by 2 striae producing 4 lateral bifurcate projections, totalling 8 conical microspines (159.0-203.9-228.8/ 105.8-128.7-151.8/ 14.0µm). Oxyasters with gradually pointed rays and conical microspines in the middle; centre with 6-8 rays 11.5-15.6 -23.0µm, diameter of centre 2.3-2.9-4.6µm.

Ecology. Associated with polychaete tubes, bryozoan colonies and colonial foraminiferans.

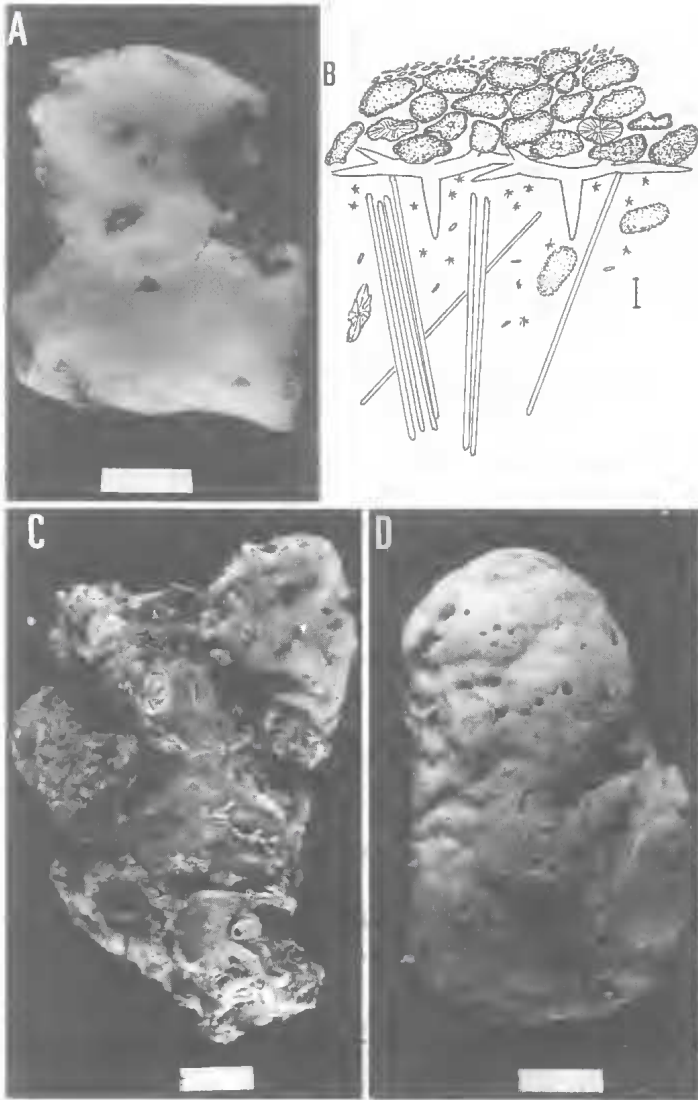


FIG. 2. Photographs of preserved material. A-B, *Erylus diminutus* sp. nov.: A, Holotype MCNPOR 347. Scale bar 5mm. B, Schematic representation of the skeleton architecture. Scale bar 0.1mm. C, *Erylus alleni*: MCNPOR 193. Scale bar 5mm. D, *Erylus formosus*: MCNPOR 2439. Scale bar 10mm.

REMARKS. The new species was identified by Mothes-de-Moraes (1978) as *Erylus oxyaster* Lendenfeld, 1910. This material was re-examined using SEM, and a comparative material was also studied: *Erylus oxyaster* Lendenfeld described by Weltner, 1927 (ZMB 6636), and *Erylus* cf. *oxyaster* sensu Desqueyroux-Faúndez & Van Soest, 1997 (MHNG Ga III 8 from Coast James Is of the

Galapagos, 00°37'S-90°51'W, 78m depth). These studies revealed that our material was closely allied to, but clearly different from the Galapagos species, and new to science. *Erylus oxyaster* differs from the present species in the possession of much larger dichotriaenes and larger categories of oxyasters and microrhabs. It is, nevertheless, a sister species of *E. oxyaster*.

***Erylus alleni* de Laubenfels,
1934**

(Figs 2C, 4A-G, Table 1)

Erylus alleni de Laubenfels, 1934: 7.

MATERIAL. HOLOTYPE: USNM 22268: Porto Rico, West Indies, 18°29'40"N, 66°08'30"W - 18°31'N, 66°10'15"W, 69.5-173.7m depth, coll. First Johnson-Smithsonian Deep-Sea Expedition. SCHIZOHOLOTYPE: MCNPOR 3449: (slides). OTHER MATERIAL. MCNPOR 1824: Maranhão, Brazil, 00°22'00"S, 44°12'00"W, 43m depth, iii.1973, coll. Barco Pesqueiro IV (SUDENE). MCNPOR 193: Rio Grande do Sul, 30°25'S, 48°48'W, 165m depth, 25.xi.1971, coll. N.P. Mestre Jerônimo (SUDEPE). MCNPOR 2202: Rio Grande do Sul, 31°20'S, 48°40'W, 150m depth, coll. N. Oc. Atlântico Sul (FURG).

DESCRIPTION. Adequate description is provided by de Laubenfels (1934), and expanded here.

Megascleres (refer to Table 1 for dimensions). Oxeas with hastate to acerate ends, few blunt, usually slightly curved, sometimes straight. Orthotriaenes: rhabd and clads with blunt ends.

Microscleres (refer to Table 1 for dimensions). Centrotylote microrhabs, smooth, usually slightly curved with pointed ends, seldom with blunt ends. Aspindasters disc-shaped or elliptical, nearly regular outline; surface microspines stellate-shaped with conical points; developmental forms are visible. Oxyasters I with 6-7 slightly microspined rays, bigger spines are located close to the distal ends. Oxyasters II with 12-16 microspined rays, spines more concentrated at the distal extremities.

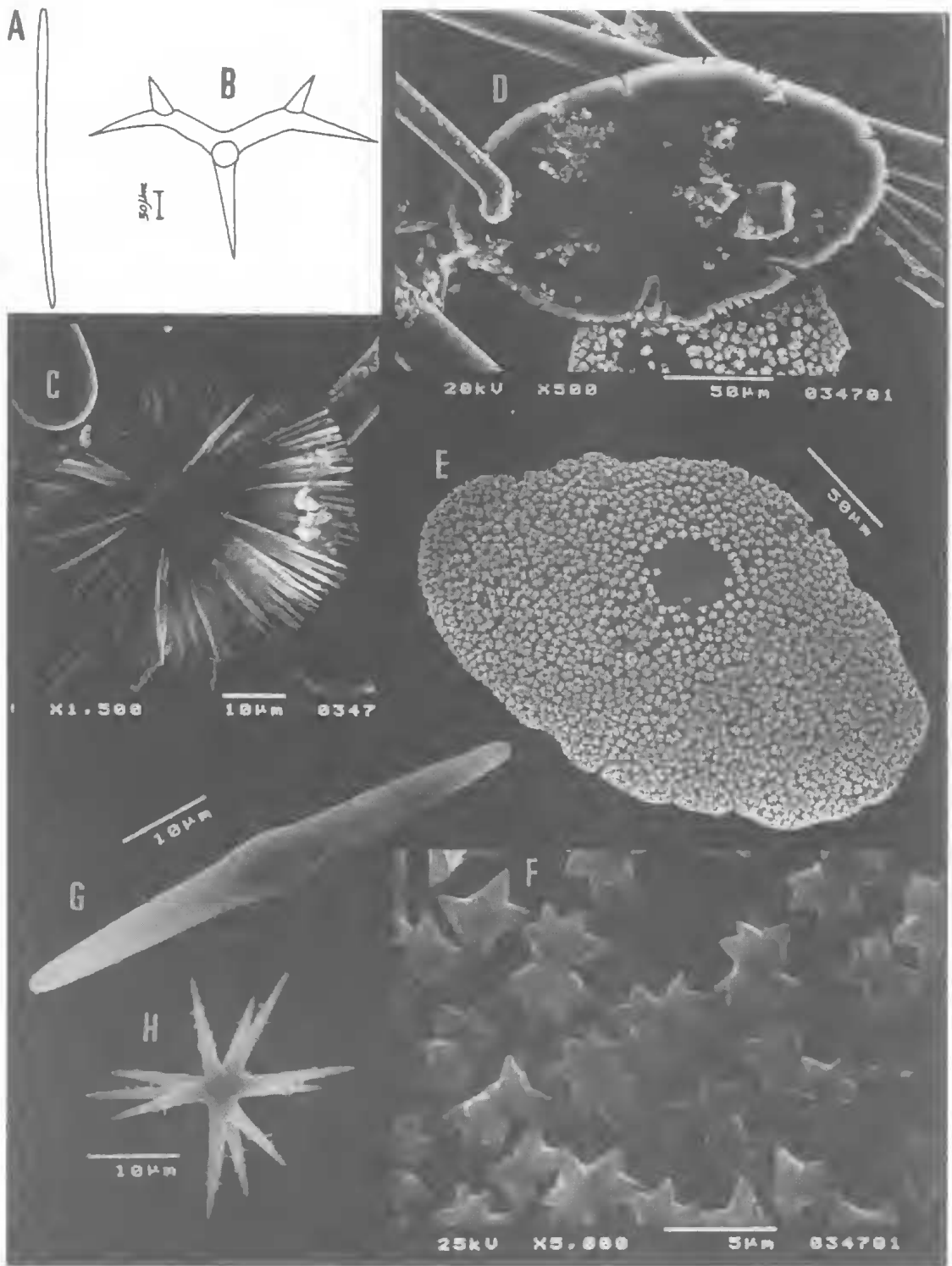


FIG. 3. *Erylus diminutus* sp. nov. (Holotype MCNPOR 347). A, strongyle. B, dichotriaene. C-D, aspider developmental stages. E, adult aspider. F, aspider surface. G, microstrongyle. H, oxyaster.

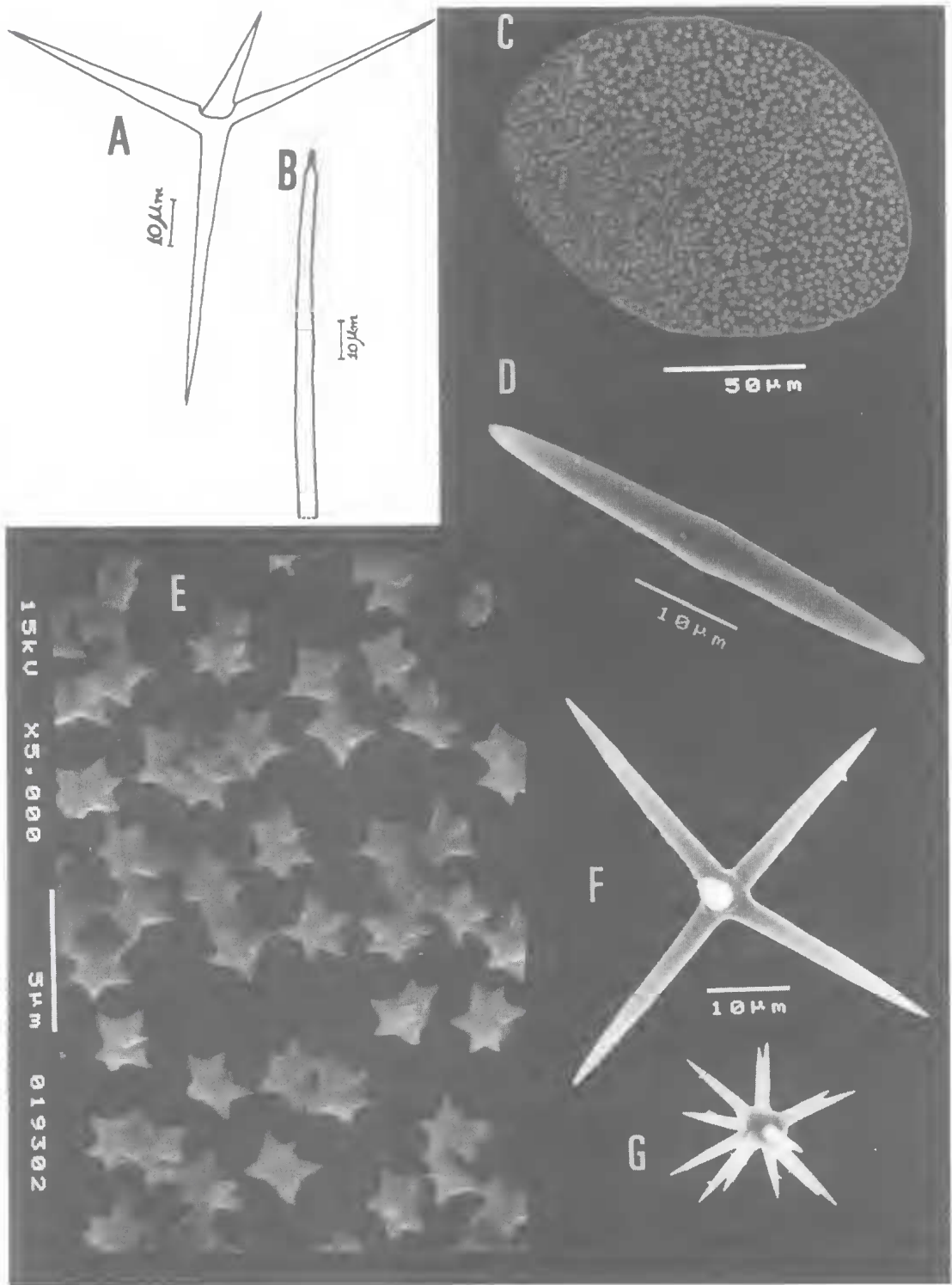


FIG. 4. *Erylus alleni* de Laubenfels (MCNPOR 1824). A, orthotriaene. B, oxea extremity. C, aspidaster. D, microxea. E, aspidaster surface. F, oxyaster I. G, oxyaster II.

TABLE 1. Comparative data on the spicule measurements of *Erylus alleni* de Laubenfels, 1934, holotype and additional material. Orthotriaenes measurements refer to shaft length/width, eladome length/ width. Measurements given in μm . Key to material of *E. alleni*: 1, Holotype USNM 22268 (data from the author); 2, Schizoholotype MCNPOR 3449 [slides]; 3, MCNPOR 1824; 4, MCNPOR 193; 5, MCNPOR 2202.

Material	Orthotriaenes	Oxeas	Aspidasters	Microxeas	Oxyasters I	Oxyasters II
1	250-300/ 13 200-300/ 13	660/12	35/70/5	37/1	30	7
2	171-465.5/ 6.9-20.7 256.5-484.5/ 9.2-18.4	465.5-608.4-684/ 4.6-9.1-13.8	69.0-108.2-126.5/ 50.6-70.8-80.5	29.9-42.2-48.3/ 2.3-2.6-3.5	25.3-38.0-48.3	8.1-11.3-16.1
3	211.6-240.0/4.6 119.6-195.0/4.6	617.5-670.9-788.5 / 6.9-11.9-16.1	92.0-105.8-133.4/ 52.9-87.4-96.6	41.4-50.6-71.3/ 1.1-4.1-4.6	23.0-32.2-39.1	9.2-11.5-16.1
4	323.0-464.3-589.0/ 18.4-33.7-50.6 266.0-418.9-570.0/ 16.1-29.9-48.3	437.0-564.6-807.5 / 4.6-9.9-20.7	112.7-134.5-144.9/ 66.7-92.2-105.8	39.1-45.6-59.8/ 4.6	46.9-34.5-59.8	11.5-18.3-27.6
5	437.0-577.6-665.0/ 27.6-37.8-46.0 408.5-505.4-617.5/ 27.6-33.1-41.4	598.5-775.2-950.0 / 9.2-15.9-20.7	85.5-117.3-142.5/ 57.0-90.3-114.0	34.5-43.2-52.9/ 4.6-5.8-6.9	25.3-39.6-57.5	9.2-13.2-16.1

REMARKS. The specimens examined above from Brazil appear to be conspecific with *E. alleni* de Laubenfels, 1934. Van Soest & Stentoft (1988) suggested this species was a synonym of *E. transiens* (Weltner, 1882), whereas we suggest that *E. alleni* differs from *E. transiens* in having two distinct size categories of oxyasters, the usual small ones and a larger one with fewer rays. *Erylus alleni* is closely related to *E. transiens*.

DISTRIBUTION. Caribbean: Porto Rico (de Laubenfels, 1934); Brazil: Maranhão and Rio Grande do Sul (present study).

***Erylus formosus* Sollas, 1886**
(Figs 2D, 5A-I, Table 2)

Erylus formosus Sollas, 1886: 195; 1888: 209, pl.28; Wiedenmayer, 1977: 181 (full synonymy); Boury-Esnault, 1973: 267, fig. 3, pls I-II; Solé-Cava, Kelecom & Kannegiesser, 1981: 125, fig. 1; Mothes & Bastian, 1993: 18, figs 7-12, 38.

MATERIAL. HOLOTYPE: BMNH 1889.1.1.77: Bahia, Brazil, 12.8-36.6m depth, ix.1973, coll. H.M.S. 'Challenger' Expedition. SCHIZOHOLOTYPE: MCNPOR 3769: Curaçao, 5-15m depth, I.ii.1981 (slides ZMA POR 4587, MCNPOR 2586). OTHER MATERIAL. MCNPOR 2439: Fernando de Noronha, Baía do Sueste, Brazil, 03°50'S, 32°25'W, <30m depth (Mothes & Bastian, 1993). MCNPOR 3807: Off Maranhão State, 02°07'35"S, 41°55'46"W, 72m depth. MCNPOR 3379: Rio Grande do Norte, 03°54'S, 37°38'W, 43.6m depth. MNHN: Paraíba, 07°29'S, 34°30'W, 45m depth (Boury-Esnault, 1973). MCN: Espírito Santo, Três Ilhas (near Guarapari), 20°36'S, 40°23'W, 3-12m depth (Solé-Cava et al., 1981).

DESCRIPTION. Adequate descriptions are provided by Sollas (1888), Boury-Esnault (1973), Solé-Cava et al. (1981) and Mothes & Bastian (1993), and expanded here.

Megascleres (refer to Table 2 for dimensions). Oxeas with acerate to hastate ends, usually slightly curved. Orthotriaenes: rhabd conical, clads and rhabd with slightly blunt ends.

Microscleres (refer to Table 2 for dimensions). Centrotlyote microstrongyles, smooth, usually slightly curved. Aspidasters usually digitiform, regular to very irregular outline; surface microspines rosette-shaped with conical points; developmental forms are visible. Oxyasters with 4-7 microspined rays, bigger spines are located close to the distal ends. Strongylaster / tylaster with 4-16 usually microspined rays.

REMARKS. This species differs from other Brazilian *Erylus* in having aspidasters usually digitiform and proportionally 1:7. Two specimens were first collected at 02°07'35"S, 41°55'46"W and 03°54'S, 37°38'W, expanding the distribution of this species along the Brazilian coast.

***Erylus corneus* Boury-Esnault, 1973**
(Fig. 6A-F, Table 3)

Erylus corneus Boury-Esnault, 1973: 268, fig. 4.

MATERIAL. HOLOTYPE: MNHN-NBE 973: Paraíba, Brazil, 07°29'S, 34°30'W, 45m depth, 1961-1962, coll. 'Calypso' Expedition. SCHIZOHOLOTYPE: MCNPOR 2505: (slide).

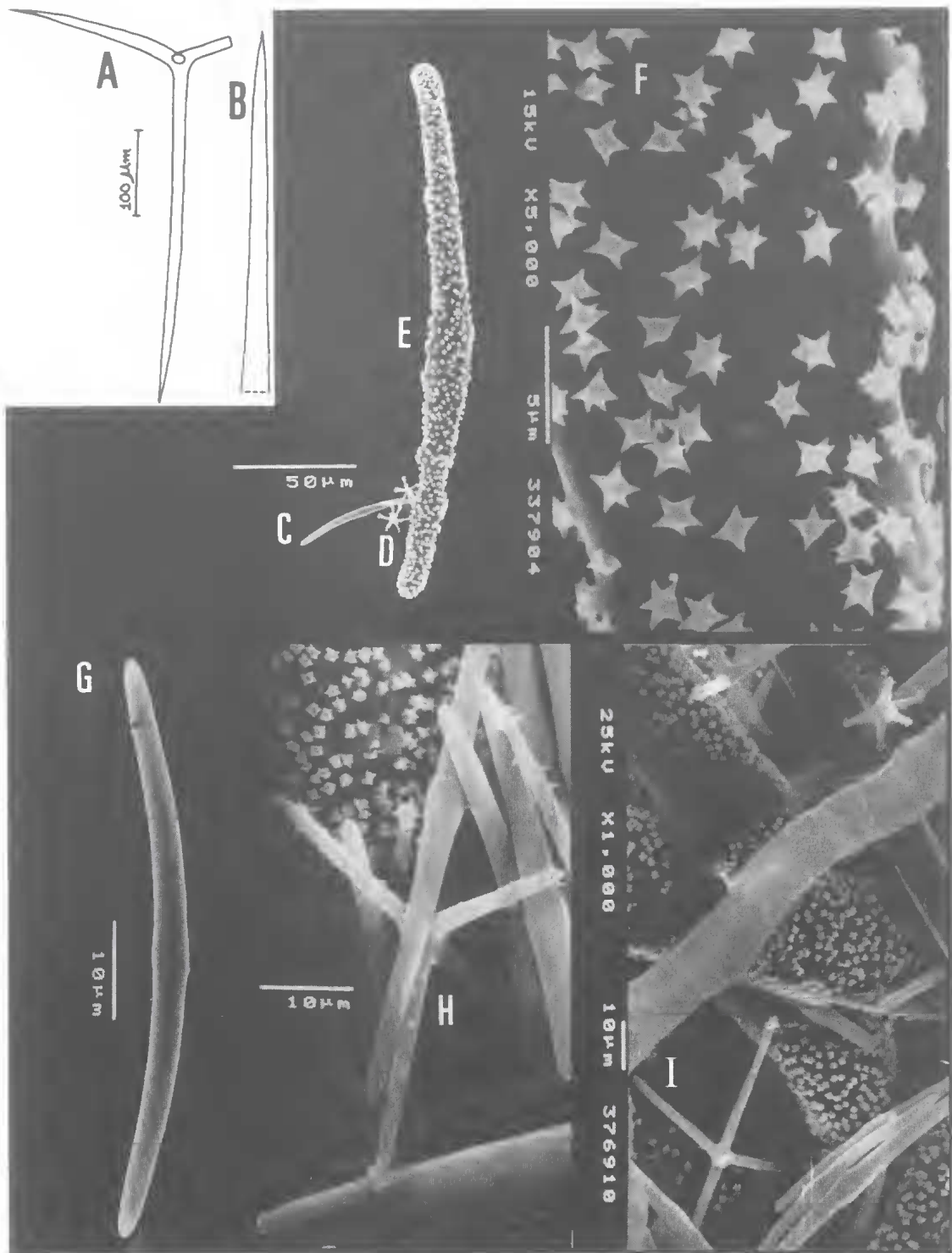


FIG. 5. *Erylus formosus* Sollas (MCNPOR 3379). A, orthotriaene. B, oxea extremity. C, microstrongyle. D, tylaster. E, aspidaster. F, aspidaster surface. G, microstrongyle. H, oxyaster. I, tylaster.

TABLE 2. Comparative data on spicule measurements of *Erylus formosus* Sollas, 1886, holotype and additional material. Orthotriaenes measurements refer to shaft length/width, cladome length/width. Measurements given in μm . Key to material of *E. formosus*: 1, Holotype – BMNH 1889.1.1.77 [data from the author]; 2, Schizoholotype MCNPOR 3769 [slides]; 3, MCNPOR 3807; 4, MCNPOR 2439 (Mothes & Bastian, 1993); 5, MCNPOR 3379; 6, Boury-Esnault (1973) [data from the author]; 7, Solé-Cava et al. (1981) [data from the author]; 8, ZMA POR 4587 [MCN POR 2586 slides]. ?=dimensions unknown, not cited by original author).

Material	Orthotriaenes	Oxeas	Aspidasters	Microstrongyles	Oxyasters	Strongylasters/ Tylaster
1	393/23.7 (21cladi)	892/23.7	14/32–175/26, 197/23.6, 122/47.4 (8-1 thickness)	70/6	63	12-16
2	180.5-304.0/ 9.2-16.1, 266.0-446.5/ 13.8-19.6	644-824.6-989.0/ 9.5-15.0-19.0	128.3-177.2-204.3 / 12.7-21.0-31.1	40.3-53.4-66.7/ 2.3-3.7-4.6	34.5-46.0-62.1	9.2-13.9-18.4
3	Not observed (Rare or Absent)	475.0-681.7-950.0 / 15.0-21.1-27.6	95.0-227.1-285.0/ 25.3-45.1-55.2	55.2-63.3-71.3/ 2.3-3.6-4.6	25.3-39.4-50.6	9.2-14.4-23.0
4	285.0-351.5/ 6.9-9.2, 171.0-247.0/ 6.9	522.5-581.8-665.0 / 6.9-11.2-13.8	133.0-153.4-171.0 / 28.5-38.9-47.5	41.4-53.8-69.0/ 2.3	23.0-28.4-39.1	6.9-13.0-18.4
5	332.5-475.0/ 9.2-11.5, 237.5-332.5/9.2	598.5-711.6-817.0 / 9.2-12.4-16.1	114.0-172.4-218.5 / 11.5-14.8-20.7	46.0-53.2-69.0/ <2.3	16.1-23.5-34.5	9.2-12.7-18.4
6	450.0-550.0/? 250.0-350.0/?	600.0-900.0/ 9.4-12.5	188.0-256.0/ 12.5-19.0	45.0-80.0/?	37.0-41.0	9.4-12.5
7	313.0-504.0-625.0/? 250.0-363.0-625.0/?	597.0-761.0-955.0 / 7.5-16.4-21.3	171.0-210.0-305.0 /?	45.0-61.0-83.0/?	27.0-47.0-64.0	8.5-12.5-16.0
8	361.0-522.5/ 9.2-13.8, 256.5-418.0/ 9.2-16.1	674.5-781.3-931.0 / 9.2-12.6-18.4	103.5-170.5-253.0 / 27.6-41.7-52.9	39.1-48.6-66.7/ 2.3-3.5-4.6	29.9-44.3-59.8	6.9-10.8-13.8

DESCRIPTION. A complete description is provided by Boury-Esnault (1973), and expanded here.

Megascleres (refer to Table 3 for dimensions). Orthotriaenes with short rhabd-like calthrops; rhabd hastate and mucronate on one side; cladome with clads slightly curved. Oxeas hastate or mucronate, slightly curved, sometimes straight or strongly curved; axial canal visible.

Microscleres (refer to Table 3 for dimensions). Centrotylote microxeas smooth and slightly curved with acerate ends. Aspidasters elliptical-shaped, nearly regular outline, surface microspines stellate-shaped with 6-10 slightly conical points; developmental forms are visible with serrated margins because of stria that radiate from its central point; small hilum. Oxyasters with 10-14 microspined rays, spines more concentrated at the distal extremities.

REMARKS ON CARIBBEAN ERYLUS

The Brazilian coast is a continuity of the Caribbean biogeographic Province. Warm and shallow-water species have their southernmost limits along the coast of Santa Catarina State (27°S) (Fig. 1), and some species extend up to the subtropical region of the coast of Rio Grande do Sul State (30°S) (Fig. 1) and neighbouring areas (Mothes, 1996), such as *E. allenii*. Nine species of

Erylus were listed in the Caribbean fauna by Pulitzer-Finali (1986). 1) *E. goffrileri* Wiedenmayer, 1977. 2) *E. amphiaстера* Wintermann-Kilian & Kilian, 1984. 3) *E. ministrongylus* Hechtel, 1965. 4) *E. allenii* de Laubenfels, 1934, considered by Van Soest & Stentoft (1988) to be synonymous with *E. transiens* (Weltner, 1882), but reinstated here, for reasons described above, as a distinct species and sister species of *E. transiens*. 5) *E. clavatus* Pulitzer-Finali, 1986, also considered by Van Soest & Stentoft (1988) as a probable synonym of *E. transiens*, apparently differing only in the narrower width of the aspidasters; *E. clavatus* could also be considered as a synonym of *E. formosus*, however it has aspidasters (with proportion 1:3), which are not comparable with those of the latter species. 6) *E. formosus* Sollas, 1886. 7) *E. trisphaera* (de Laubenfels, 1953) (originally described in *Unimia*), and 8) *E. bahamensis* Pulitzer-Finali, 1986, both have much narrower aspidasters (with proportion 1:9) than other Caribbean species, however, *E. formosus* and *E. trisphaera* differ by the presence of oxyasters, and *E. trisphaera* has trilobate aspidasters. 9) *E. discophorus* (Schmidt, 1862) and *E. enastrum* (Schmidt, 1868), both originally described in *Stelletta* from the Adriatic, are certainly not conspecific with Caribbean species given their disjunct distributions. *Stellettinopsis*

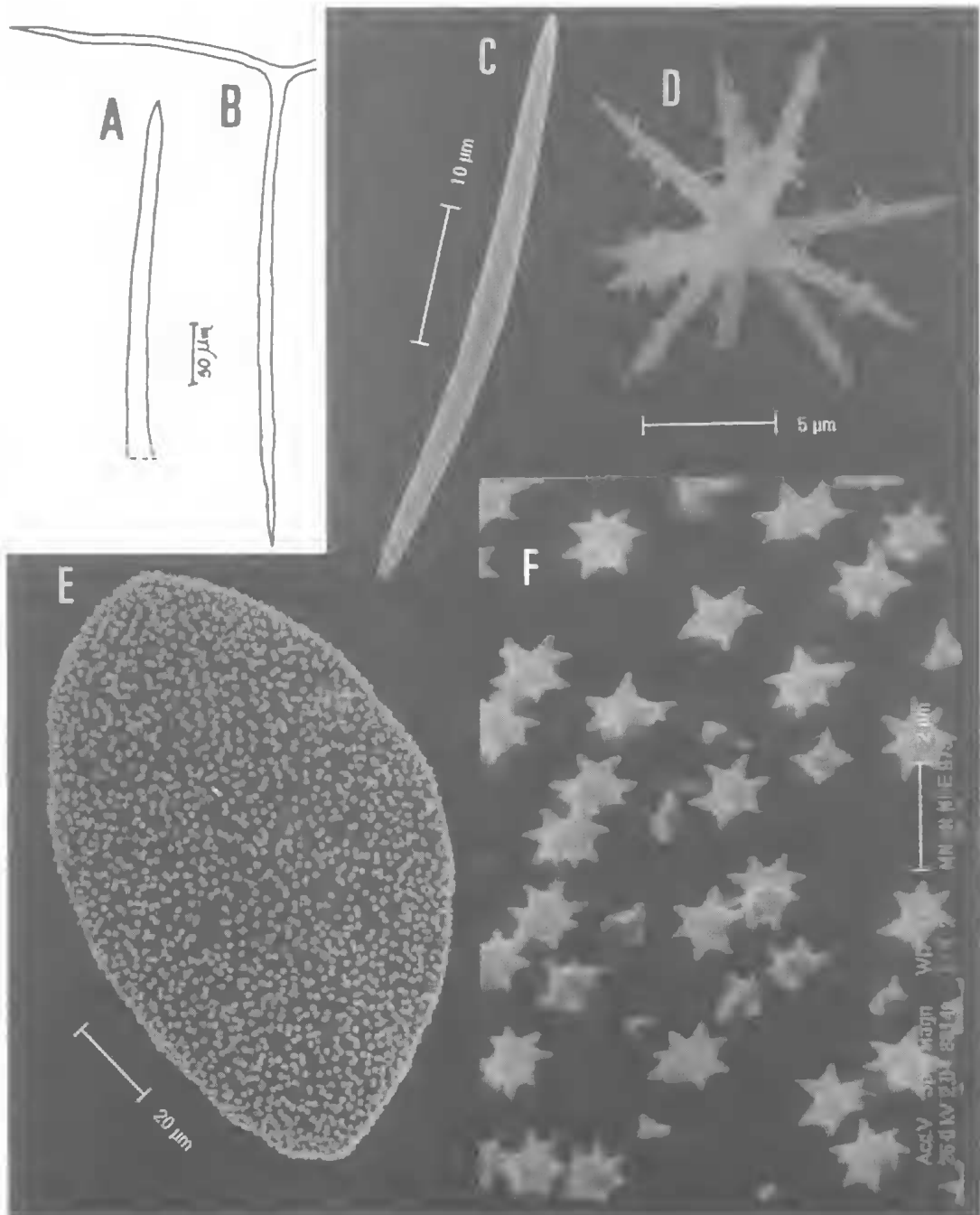


FIG. 6. *Erylus corneus* Boury-Esnault (Schizoholotype MCNPOR 2505). A, oxea extremity. B, orthotriaene. C, microxea. D, oxyaster. E, aspidaster. F, aspidaster surface.

euastrum Schmidt, 1880 was cited from Grenada by Van Soest & Stentoft (1988), but this specimen may belong to *E. transiens*. Of all these species *E. diminutus* sp. nov. is closest to *E.*

ministrongylus in having strongyles, dichotriaenes and elliptical aspidasters (with proportion 1:2), although differing by the presence of microstrongyles and a single

TABLE 3. Data on spicule micrometries of *Erylus corneus* Boury-Esnault, 1973. Holotype and Schizoholotype. Measurements given in μm . Key to material of *E. corneus*: 1, Holotype - MNHN-NBE 973 [data from the author]; 2, Schizoholotype - MCNPOR 2505 [slides].

Material	Orthotriaenes	Oxeas	Aspidasters	Microxeas	Oxyasters
1	56.0-125.0 actines	546.0-673.0 / 9.0-19.0	125.0-153.0 / 69.0-84.0	37.0-56.0 / 1.0-3.0	12.5-22.0
2	126.5-380.0/ 11.5 , Clads 119.6-213.7 / 5.7- 9.2	494.0-680.0/ 8.0-19.5	119.6-147.2/ 72.4-87.4	27.6-57.5/ <2.3-3.5	9.2-23.0

category of oxyasters. A taxonomic revision of these Caribbean species is currently in progress.

DISCUSSION

Lendenfeld (1910) introduced the term 'aspidaster' for the special spicules of *Erylus*, being smooth in the young stages, shield-like shape (flattened) and oval, rarely round or irregular discs. However, some species have globiform, either circular or ellipsoidal aspidaster spicules, identical to sterrasters of *Geodia*. Consequently, we propose to enlarge the definition of the genus here, given that both sterrasters and aspidasters may be found in some species of *Erylus* (i.e. *E. polyaster*, *E. geodioides* and *E. topsenti*). The proposition to enlarge the scope of the genus to include additional forms of spicules is based only on adult spicules described here, and from species previously recorded in the literature.

In the present revision, a 'provisionally endemic' new species is described; the distribution of *E. formosus* is enlarged; the presence of *E. alleni* is recorded for the first time for the Brazilian coast; and zoogeographical data on marine demosponges from Brazil, recorded by Hechtel (1976) and Mothes (1996), are expanded.

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LITERATURE CITED

- BOURY-ESNAULT, N. 1973. Campagne de la 'Calypso' au large des côtes atlantiques de l'Amérique du Sud (1961-1962). 1, 29. Spongiaires. Annales de l'Institut Océanographique, Paris 49 (Supplement): 263-295.
- DENDY, A. 1916. Report on the Homosclerophora and Astrotetaxonida collected by H.M.S. 'Sealark' in the Indian Ocean. In Reports of the Percy Sladen Trust Expedition to the Indian Ocean in 1905. Vol. 6. Transactions of the Linnean Society of London, Zoology 17: 225-271.
- DESQUEYROUX-FAUNDEZ, R. & SOEST, R.W.M. VAN 1997. Shallow waters Demosponges of the Galápagos Islands. Revue Suisse de Zoologie 194(2): 379-467.
- GRAY, J.E. 1867. Notes on the arrangement of sponges, with the description of some new genera. Proceedings of the Zoological Society of London (1867): 492-558.
- HECHTEL, G.J. 1965. A systematic study of the Demospongiae of Port Royal, Jamaica. Bulletin of the Peabody Museum of Natural History 20: 1-103.

1976. Zoogeography of Brazilian Marine Demospongiae. Pp. 237-260. In Harrison, F.W. & Cowden, R.R (eds) *Aspects of Sponge Biology*. (Academic Press: New York).
- LAUBENFELS, M.W. DE 1934. New sponges from the Puerto Rican deep. *Smithsonian Miscellaneous Collections* 91(17): 1-28.
1936. A discussion of the sponge fauna of the Dry Tortugas in particular, and the West Indies in general, with material for a revision of the families and orders of the Porifera. *Carnegie Institute of Washington Publication. Papers of the Tortugas Laboratory* 30(467): 1-225.
1953. Sponges from the Gulf of Mexico. *Bulletin of Marine Science of the Gulf and Caribbean* 2(3): 511-557.
- LENDENFELD, R. VON 1903. *Tetraxonia*. Pp. 1-168. In Schulze, F.E. (ed.) *Das Tierreich*. (Berlin).
1907. Die Tetraxonia. In Chun, C. (ed.) *Wissenschaftliche Ergebnisse der deutschen Tiefsee-Expedition auf dem Dampfer 'Valdivia' 1898-1899*, Jena 11: 59-374.
1910. The Erylidae. In *Reports on the scientific results of the Expedition to the eastern Tropical Pacific, in charge of Alexander Agassiz, by the U.S. Fish Commission Steamer 'Albatross' 1904-1905 and of other expeditions of the 'Albatross', 1888-1904. Memoirs of the Museum of Comparative Zoology, Harvard* 41(2): 261-324.
- LÉVI, C. 1973. Systématique de la classe de Desmospongiaria (Demosponges). Pp 577-631. In Brien, P., Lévi, C., Sarà, M., Tuzet, O. & Vacelet, J. (eds) *Traité de Zoologie. Anatomie, Systématique, Biologie*. (Sér.ed. Grassé, P-P.) (Masson et Cie: Paris).
- MOTHES, B. 1996. *Esponjas da Plataforma Continental Norte e Nordeste (Amapá ao Maranhão) do Brasil*. PhD Thesis (Universidade de São Paulo: São Paulo).
- MOTHES, B. & BASTIAN, M.C.K. de A. 1993. *Esponjas do Arquipélago de Fernando de Noronha (Porifera, Demospongiac)*. *Iheringia (Zoologia)* (75): 15-31.
- MOTHES-DE-MORAES, B. 1978. *Esponjas tetraxonidas do litoral sul-brasileiro: II. Material coletado pelo N/Oc. 'Prof. W. Besnard' durante o Programa RS. Boletim do Instituto Oceanográfico, São Paulo* 27(2): 57-78.
- PULITZER-FINALI, G. 1986. A collection of West Indian Demospongiae (Porifera) with, in appendix, a list of the Demospongiae hitherto recorded from the West Indies. *Annali del Museo Civico di Storia Naturale di Genova* 86: 65-216.
- RIDLEY, S.O. 1884. *Spongiida*. Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. 'Alert', 1881-2. Pp. 366-482, 582-635. (British Museum (Natural History): London).
- SCHMIDT, O. 1862. *Die Spongien des Adriatischen Meeres*. Pp. 1-48 (Wilhelm Engelmann: Leipzig).
1868. *Die Spongien der Küste von Algier. Mit Nachträgen zu den Spongien des Adriatischen Meeres (Drittes Supplement)* (Wilhelm Engelmann: Leipzig).
1880. *Die Spongien des Meerbusen von Mexico (und des Caraibischen Meeres)*. Pp. 33-90 *Zweites (Schluss-) Heft* (G. Fischer: Jena).
- SOEST, R.W.M. VAN 1994. Demosponge distribution patterns. Pp. 213-223. In Soest, R.W.M. van, Kempen, T.M.G. van & Braekman, J.-C. (eds) *Sponges in Time and Space*. (Balkema: Rotterdam).
- SOEST, R.W.M. VAN & STENTOF, N. 1988. Barbados deep water sponges. *Studies on the Fauna of Curaçao and Other Caribbean Islands* 70(215): 1-175.
- SOLÉ-CAVA, A.M., KELECOM, A. & KANNEN-GIESSER, G.J. 1981. Study of some sponges (Porifera Demospongiae) from the infralitoral of Guarapari, Espírito Santo, Brazil. *Iheringia (Zoologia)* (60): 125-150.
- SOLLAS, W.J. 1885. A classification of the sponges. *Annals and Magazine of Natural History* (5)16: 395.
1886. Preliminary account of the tetractinellid sponges dredged by H.M.S. 'Challenger'. Part I. The Choristida. *Scientific Proceedings of the Royal Dublin Society* 5: 177-199.
1888. Report on the Tetractinellida collected by the H.M.S. 'Challenger', during the years 1873-76. Pp. 1-455. In *Report on the Scientific Results of the Voyage of H.M.S. 'Challenger' during the Years 1873-76. Vol. 25 (Her Majesty's Stationary Office: London, Edinburgh, Dublin)*.
- TOPSENT, E. 1894. *Etude monographique des spongiaires de France. I. Tetractinellida*. *Archives de Zoologie Expérimentale et Générale* (3)2: 259-398, pls 11-16.
- WELTNER, W. 1882. *Beiträge zur Kenntniss der Spongien*. (Inaugural-Dissertation: Univ. Freiburg).
- WIEDENMAYER, F. 1977. Shallow-water sponges of the Western Bahamas. *Experimentia Supplementa* 28: 1-28 (Birkhäuser: Basel).
- WILSON, H.V. 1925. Silicious and horny sponges collected by U.S. Fisheries Steamer 'Albatross' during the Philippine Expedition, 1907-10. In *Contributions to the biology of the Philippine Archipelago and adjacent regions. Bulletin of the United States National Museum* 100(2, 4): 273-532.
- WINTERMANN - KILIAN, G. & KILIAN, E. F. 1984. *Marine Sponges of the Region of Santa Marta (Colombia) - Part II. Homosclerophorida, Choristida, Spirophorida, Hadromerida, Axinellida, Halichondrida, Poecilosclerida*. *Studies on Neotropical Fauna and Environment* 19(3): 121-136.